A splash of detergent...

Nanomaterials are used everywhere from catalytic converters like the one shown here to solar panels to cancer phototherapy. (Image courtesy of Getty Images)

makes catalytic compounds more powerful

Instead of washing dishes, researchers put detergent to work molding tiny particles into precise shapes to vastly improve their potency.

By Troy Rummler

Researcher David Rosenberg examines images of a white powder under a powerful scanning electron microscope. Up close, the powder looks like coarse gravel, a heap of similar but irregular chunks. Then he looks at a second image — the same material produced by colleague Hongyou Fan instead of purchased from a catalog — and he sees perfectly smooth, uniform spheres.

"I've never seen anything like this. At this scale, nobody can control the shape or the size that well. This technology does both."

The uniform powder and others like it produced at Sandia National Laboratories don't just look nice, they outperform commercial varieties used as catalysts in solar cells and which could be used to produce clean-burning hydrogen fuel. If developed for industry, the new technology — subject of a recent paper in *Nano Letters* — could improve performance while reducing costs of catalysts used everywhere from environmental cleanup to cancer treatment.

Its key ingredient: detergent.

In fact, it's a commercial-grade version not unlike household dish soap, minus the dyes and perfumes. Hongyou, the inventor of the detergent-based technology, and his team at the shared Advanced Materials Laboratory at the University of New Mexico use the active ingredient in cleaning solutions to trap raw materials just like grease, encapsulating them inside cages made up of detergent molecules. The cage acts as a molecular mold that dictates the size and shape — or morphology — of the material that forms inside. Remove the detergent, and you're left with clean, uniform particles.

(Continued on page 3)

Inside . . .

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Sandia LabNews

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How microgrids could boost resilience in New Orleans

By Kristen Meub

During Hurricane Katrina and other severe storms that have hit New Orleans, power outages, flooding and wind damage combined to cut off people from clean drinking water, food, medical care, shelter, prescriptions and other vital services.

In a year-long project, researchers at Sandia and Los Alamos national laboratories teamed up with the city of New Orleans to analyze ways to increase community resilience and improve the availability of critical lifeline services during and after severe weather.

The team used historical hurricane scenarios to model how storms cause localized flooding, disrupt the electrical system and cut off parts of the community from lifeline services. Sandia researchers then developed a tool to analyze and identify existing clusters of businesses and community resources in areas less prone to inundation — such as gas stations, grocery stores and pharmacies that could be outfitted with microgrids to boost resilience.

(Continued on page 4)

KEEPING THE POWER ON — Robert Jeffers was part of a research team at Sandia that analyzed ways to increase resilience in New Orleans during and after severe weather. (Photo by Randy Montoya)

‘Keep the pedal down’ for mission work: Nuclear Deterrence all hands

Associate Labs Director Steve Girrens emphasizes mission growth, commitment to hiring

By Stephanie Holinka

(Left to right): Directors Mark Rosenthal, Cliff Renschler, Scott Holswade (with mic) and Rick Fellerhoff, and Associate Labs Director Steve Girrens (Berlinda Eras is partially visible behind Girrens on the far right). (Photo by Norman Johnson)

“I’ve been a Sandian for 375 days, and it’s been the most exciting 375 days of my life. Thank you all for allowing me to be here and work with you,” Chief Engineer and Nuclear Deterrence Associate Labs Director Steve Girrens told a May 10 all hands audience.

This meeting was the second Nuclear Deterrence (ND) portfolio-wide all hands meeting since the change of Sandia’s management and operating contract last year. Steve used the opportunity to share his excitement about being a Sandian with audiences in New Mexico and those watching from California, the Weapons Test Laboratory at Pantex in Texas, and Washington, D.C.

Steve acknowledged the incredible job everyone is doing Labs-wide to successfully deliver on the record amount of mission work, with indications that the next few years will be even busier than initially predicted.

Record-setting mission work

“Budgets are still increasing,” said Rick Fellerhoff, of the ND Program Management Office and deputy Associate Labs Director, who outlined projects for FY19 and beyond that illustrate the Labs’ continued project growth. “We used to project that budgets would be tailing off in FY20 and beyond, but now it looks like we’re going to be big well into next decade.”

Rick noted that the $200 million increase in mission work from FY17 to FY18 “is about the biggest annual increase we can absorb.” He said increases of that magnitude are especially challenging when the Labs must operate under a continuing resolution, as it did earlier this year and last year. Rick credits extensive Labs leadership planning and coordination with NNSA for continued hiring of the talent needed while budgets worked their way toward congressional approval.

Such a high volume of work would not be possible, Rick says, without significant recapitalization investments made over a decade ago in Microsystems and Engineering Sciences Applications, Z Machine and Area III environmental testing improvements, which helped prepare Sandia infrastructure and capabilities for the current volume of mission work.

Rick sees the same type of recapitalization investment required as Sandia continues to deliver on its major commitments into the future. “If we’re going to be taxing our infrastructure as we are now, with all this great work, we need to ensure continuing infrastructure renewal and refurbishment to keep us prepared for future work,” Rick said.

What does the future hold?

Steve touched on potential 2018 Nuclear Posture Review impacts for Sandia and emphasized that nothing is “reality” until there is an implementation plan and funding, but said, “We’re ready to go on potential work fronts when and if that happens.”

Director Joel Lash of Engineering Sciences presented on the challenge of Sandia developing a full engineering model of stockpile systems, outlining how new approaches to modeling will help cover the spectrum of environments, disciplines, fidelity and applications. Joel said four initial proposals are slated to start next year, including one that is a Laboratory Directed Research and Development Mission Campaign.

The 90-minute meeting also featured discussions of accomplishments by directors Scott Holswade, Jim Handrock, Cliff Renschler and Mark Rosenthal, and Ming Lau, senior manager for the California program.

Each director laid out his responsibilities and the structure for parts of the ND portfolio, and shared important technical milestones on projects that support Labs’ production and its six major programs — B61-12 Life Extension Program (LEP), W76-1 LEP, W87/Mk21 Fuze Replacement, W80-4 LEP, W88-0/Mk5 Alteration and the Mobile Guardian Transporter.

Challenges

“All of those Labs’ accomplishments don’t happen without people,” Steve said. He explained that 60 percent of Sandia employees have been here less than 10 years and 80 percent, less than 20 years. He views this movement as “a healthy indicator that we’re vibrant moving into the future.”

Steve emphasized that it’s important to the nation that Sandia remain one of the best places in the country to work. “If it’s not, we’re not going to maintain that hiring and bring in all those people who get the work done.”

Despite Sandia’s success in hiring, the challenge is ongoing. “We can’t lighten up on our hiring focus — keep the pedal down,” Steve said.

Steve ended with a thank you and a reminder, “You’re the premiere workforce for executing this important mission for the United States of America in national security.” He encouraged all to keep up the good work.

Members of the workforce who missed it can watch and listen to the meeting online.

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John Dec applauded on international stage

By Michael Padilla

JOHN DEC

Sandia Exceptional service in the national interest
CaliforniaNews

John Dec has been selected as one of the 2018 SAE International Lloyd L. Withrow Distinguished Speaker Award recipients. This honor is given to speakers at SAE meetings who have received the Oral Presentation Award more than twice.

John received his award at the annual SAE business meeting held during the SAE 2018 World Congress in Detroit.

“I am honored to be selected to receive this award and to be part of the SAE community,” says John. “Most of all I am fortunate to belong to a widely respected and knowledgeable engine research team at the Combustion Research Facility.”

The award recognizes individuals for their outstanding presentation skills. It was created to inspire a high level for presentations at SAE technical sessions.

This is the third Lloyd L. Withrow award John has received; he earned the others in 1999 and 2007.

Originally established in 1984 as the SAE Distinguished Speaker Award by the Engineering Meetings Board, the award was renamed in 1993 to honor the late Lloyd L. Withrow, a leader for decades in engine combustion and automotive fuels and lubricants.

Shadid named SIAM fellow

By Neal Singer

Sandia computational scientist and mathematician John Shadid has been named a 2018 Fellow of the Society for Industrial and Applied Mathematics.

A distinguished member of Sandia's technical staff and a National Laboratory Professor of Mathematics and Statistics at the University of New Mexico, John's selection was based upon his research on solution methods for multiphysics systems, scalable parallel numerical algorithms and numerical methods for strongly coupled nonlinear partial differential equations, according to the society.

John will be recognized for his achievements during SIAM's annual meeting July 9-13 in Portland, Oregon.

Humbled by the honor

Said John, "It is an honor to be awarded this distinction from such an exceptional organization as SIAM with such an outstanding collection of current fellows. I also realize that the number of worthy individuals for this distinction is significantly larger than the allocated appointments, and therefore it is truly humbling as well."

He also expressed gratitude "for the unique opportunities at Sandia during the early development of parallel computing algorithms and hardware, the strong and insightful leadership of a number of our center directors, and also for the outstanding and long-term research collaborators I have had the good fortune to work with over the years."

Finally, he recognized the value of the sustained funding he has received from the Department of Energy Office of Science's Advanced Scientific Computing Research Applied Mathematics Program. "Without these contributions," he said, "this distinction would not have been possible."

John is one of 28 SIAM members selected for fellow status this year and only the fifth Sandia scientist to earn the honor. Bruce Hendrickson and Pavel Bochev in 2012, Tamara Kolda in 2015 and Cynthia Phillips in 2016 preceded him.

John currently carries out research in numerical methods for multiple-time-scale nonlinear systems, temporal and spatial discretizations for partial differential equations, and scalable iterative solution methods for multiphysics systems with application to computational fluid dynamics, magnetohydrodynamics and multi-fluid electromagnetic plasma systems modeling.

Sandia computational scientist and mathematician John Shadid has been named a 2018 Fellow of the Society for Industrial and Applied Mathematics. (Photo by Randy Montoya)

Helped developed Aztec solver

John's technical contributions and team leadership have led to two Gordon Bell Prize finalist nominations in 1994 and 1997 for work on large-scale parallel implicit finite element reacting flows and Aztec, a parallel, sparse-matrix, iterative-solver library. He won an R&D100 award, also in 1997, for his development of Aztec with Sandia researchers Scott Hutchinson and Ray Tuminar and former Sandian Lydie Prevost.

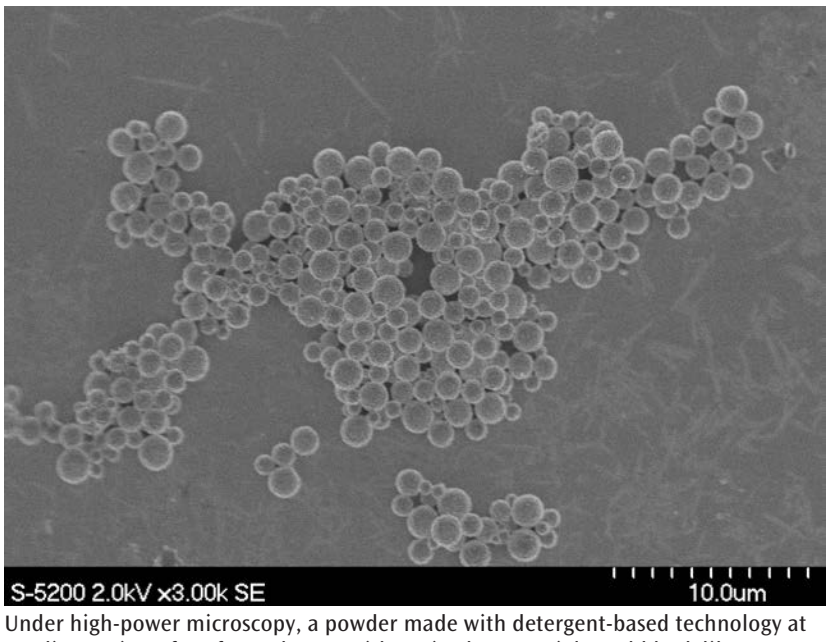
Aztec was among the very first publicly available, parallel scalable iterative solver libraries for very large-scale sparse-matrix systems and made significant contributions to the DOE ASCR and Advanced Scientific Computing Initiative efforts, Sandia engineering and scientific application codes, as well as the broader scientific research community.

Leaving a human legacy as well as a technical one, John has supervised and mentored 18 Sandia post-doctoral researchers, served on eight doctoral committees and mentored 24 masters and doctoral students.

SIAM is an international society of more than 14,000 individual, academic and corporate members from 85 countries. It seeks "to build cooperation between mathematics and the worlds of science and technology to solve real-world problems," according to its website.

Soapy Nanos

(Continued from page 1)



Under high-power microscopy, a powder made with detergent-based technology at Sandia consists of perfect spheres. Without it, the material would look like coarse gravel. Consistency makes catalytic materials considerably more effective. (Image courtesy of Hongyou Fan)

"Normally, you would have very little control over the reaction that produces these materials," says Hongyou. "This leads to irregular morphology."

That can be a problem for the engineers who use those materials. Some catalysts don't work unless they're arranged in specific ways at the molecular level, and some light-absorbing particles used in solar cells soak up more sunlight at certain sizes than others. When individual particles are irregular, only a fraction of the bulk material performs the way it's meant to. The rest is dead weight, which also makes it tough to predict the catalyst's performance.

Because Hongyou's particles are uniform and tightly controlled, engineers could use less material and get the same effect as conventional powders. In one study, Hongyou's version of a photocatalyst, which could be used to clean wastewater, broke down five times more pollutant than its commercial counterpart. In his latest paper, he demonstrated similar improvements in a material that catalytically produces hydrogen.

Consistency improves performance predictions

David is scaling up and applying the technology to his explosives research for national security, where unpredictable materials are unacceptable. Alongside a team that's improving the inputs to computer models, "we saw an incredible, powerful application as it feeds into our modeling efforts," he says.

Sandia develops computer simulations so that David and his team don't have to physically build and test parts every time. But assumptions that get put into those models can compromise the output.

To save computing resources and time, a simulation may assume particles have simpler shapes or are more consistent than they really are. But, it will never perfectly predict how the real material acts. Hongyou's uniform powders align the material with the model, providing David the ability to control the particles' structure so that many of the mathematical assumptions go away.

"We could look at models that perfectly describe the physical characteristics of the powder, and that would give us an incredible tool both for validating existing models and for developing new ones."

Change the detergent, change the shape

Hongyou also is optimizing materials for potential applications like energy conversion in solar cells, phototherapy for cancer treatment and hydrogen production for clean fuel sources by creating well-known particles in brand new shapes. One detergent may result in spheres, but Hongyou can swap it out for a detergent that produces discs, rods or octahedrons. In the study that measured photocatalytic performance, he tested eight shapes against the commercial counterpart before crowning the most effective form.

But so far, Hongyou has largely discovered these shapes through trial and error. So he's enlisted the aid of Younan Xia, a professor at the Georgia Institute of Technology and a pioneer in nanomaterial synthesis, to accelerate his work.

"We are measuring fundamental kinetics, how fast atoms or molecules are deposited on the surface of growing nanoparticles," Younan says. "The final structure of particles depends on that rate relative to the surface diffusion rate," or the rate at which molecules drift away.

Younan and Hongyou are working together to develop a recipe to replicate certain shapes based on the detergent, temperature, pH value and concentration. Like turning knobs, they could adjust these inputs to get a reliable output.

"If you don't have a quantitative knob, you might perform the experiment one hundred times before you get the right shape," Younan says. "With one, we hope we can get it right after the first or second try."

Georgia Tech is a member of Sandia's academic alliance. The alliance aims to solve the nation's significant technical problems, develop the next-generation of scientists and engineers and accelerate the adoption of new technologies.

This research was funded by Sandia as a Laboratory Directed Research and Development project.

Sandia student intern Casey Karler collects crystallized nanomaterials developed by Hongyou Fan. (Photo by Rebecca Gustaf)

New Orleans skyline at night.
(Photo by Paul Wood, Flickr Creative Commons)

Microgrids

(Continued from page 1)

A microgrid is an area of hardened electrical infrastructure that connects multiple buildings through a system of localized power generation and automatic control, ensuring access to electricity for these buildings even if the bulk of a city's power grid goes down. Sandia calls these microgrid hubs "resilience nodes" because they improve the availability of essential services to nearby neighbors by enabling enhanced adaptation, response and recovery from electric grid disruptions.

"I would say that in a large majority of the cases, the breakdown in providing services during and after severe weather can be traced back to localized flooding and a loss of electrical power," Robert Jeffers, a Sandia systems scientist, said. "When you figure out how to keep the power on, you also enable all the other services the facilities could provide."

New Orleans' primary community resilience goal, subject to a major storm event, is to safely provide citizens with critical infrastructure services as quickly and reliably as possible. The number of people without access to lifeline services became the resilience metric the research team used to evaluate potential grid resilience improvements.

The project was funded by the Department of Energy's Grid Modernization Laboratory Consortium. The GMLC was established as a strategic partnership between DOE and the national laboratories to bring together leading experts, technologies and resources to collaborate on the goal of modernizing the nation's grid. It is one of the main components of the department's Grid Modernization Initiative, a comprehensive effort to help shape the future of the nation's grid.

The city of New Orleans was the primary partner for defining community resilience in the project, and additional support and subject matter expertise came from 100 Resilient Cities. 100 Resilient Cities was created by the Rockefeller Foundation five years ago during the foundation's centennial year. This project is one of many 100 Resilient Cities projects around the world with the goal of improving urban resilience.

Information also was obtained from Entergy New Orleans, the Sewerage and Water Board of New Orleans and the Army Corps of Engineers.

"I would say that in a large majority of the cases, the breakdown in providing services during and after severe weather can be traced back to localized flooding and a loss of electrical power."

Applying historical storm data to model future impacts

Robert said the team started by asking what would constitute a worst-consequence storm scenario for New Orleans. When researchers posed this question to city and utility officials, a specific vision emerged: A Category 2 or low-level Category 3 hurricane — one that was not considered large enough for a mandatory evacuation or one that ends up being larger than forecast — makes landfall in New Orleans and stalls over the city. In this hypothetical scenario, the storm dumps 20 to 25 inches of rain during a 24-hour period and the dewatering pumps throughout the city function at a fraction of their maximum capacity during the first day of the storm. In such a scenario, he said, many residents would be displaced due to flooding and sustained citywide power outages, and would lack access to basic services.

THE DEVASTATION WROUGHT by Hurricane Katrina in 2005 left some 1.5 million people without electricty. Sandia is one of several partner organizations developing approaches to make grids in cities like New Orleans much more resilient.
(Photo courtesy of the U.S. Coast Guard)

Researchers used two historic hurricane tracks that feature conditions with devastating consequences for analysis and modeling: Hurricane Katrina and an unnamed storm from 1947. The 1947 storm was chosen because it approached New Orleans from the southeast and moved up the Mississippi River, where critical infrastructure is located.

Researchers simulated these storms by using their actual trajectories and then modeled their impact at a range of intensities, speeds and rainfall amounts. Based on these simulations, they modeled the impact of the storms on the performance of critical infrastructures and associated lifeline services. The models accounted for recent resilience improvements implemented by the city of New Orleans, the Army Corps of Engineers, Entergy and private businesses after Hurricane Katrina.

Based on the storm modeling data and the output from the tool, Robert said researchers developed new algorithms to identify possible locations where a resilience node or alternative grid modernization strategies would have sizable impact on improved community access to lifeline services during and after a major electric grid disruption.

The city and its partners are using the analysis to support consideration of microgrid technology within a resilience district.

New Orleans business district skyline.
(Photo by VerruckteDan, Wikipedia Commons)

40th anniversary International Training Course

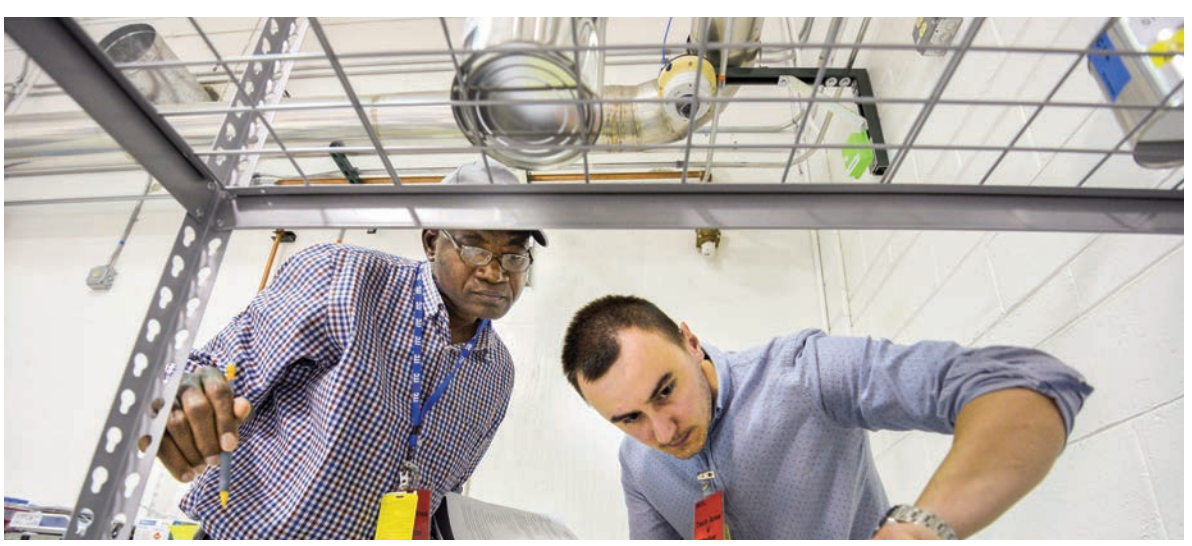
By Mollie Rappe
Photos by Randy Montoya

Last week marked the end of the latest three-week International Training Course on the physical protection of nuclear material and nuclear facilities, which began in 1978. This 40th anniversary course provided training on international best practices for physical protection of nuclear material and nuclear facilities to 50 participants from 38 countries as well as two observers from Taiwan.

The participants included nuclear operators for research reactors and power plants and state regulators and policy makers. NNSA and the International Atomic Energy Agency co-sponsor the course every 18 months, which has always been held at Sandia and taught primarily by Sandia instructors.

The course involves classroom training and hands-on exercises. Some of these exercises are held at Sandia's Integrated Security Facility. This facility uses the security systems originally designed to protect Category 1 nuclear material in Tech Area 5 that now serves as a venue for hands-on physical security training. With its fully functional physical security and material accounting systems, the facility is invaluable for demonstrating physical security, material control as well as safety concepts and principles.

ITC participants watch the procedure to open a mock nuclear material storage vault. Controlling the access to nuclear material is the first step in nuclear material accountancy and control.



ITC participants check a few randomly selected mock nuclear items. This nuclear material accountancy and control method can detect and deter insider threats, as well as detect minor irregularities due to human error.

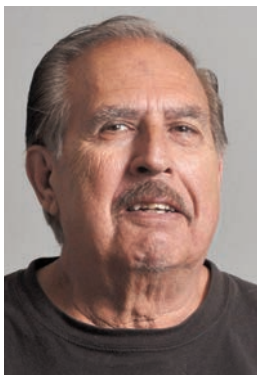
ITC participants practice using telemanipulators.

ITC participants compare the label, location and condition of a few randomly selected mock nuclear items to their records and confirm the tamper-evident tags are intact.

ITC participants receive and process a shipment of mock nuclear material and uncover an error in the paperwork.

Mileposts

New Mexico photos by Michelle Fleming
California photos by Randy Wong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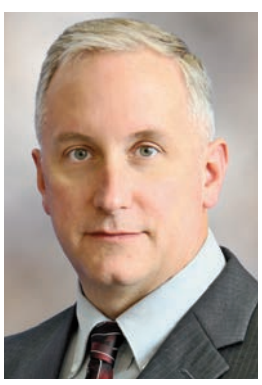
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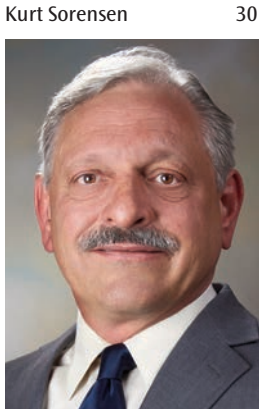
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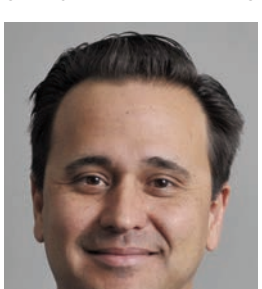
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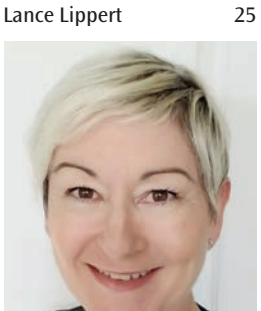
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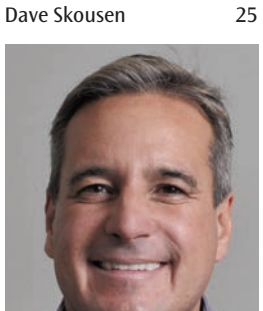
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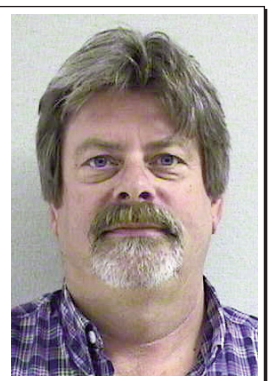
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- Bldg. 858 EL, lobby
- Bldg. 880, Aisle D, north lobby
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- Bldg. 898, east lobby
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- Bldg. 891, lobby
- Bldg. 836, lobby
- Bldg. 831/832 north lobby
- Bldg. 861, Cafeteria lobby
- Bldg. 870, lobby
- Bldg. 823, lobby
- Bldg. 701, next to elevator
- IPOC, lobby
- CGSC, lobby
- CRSI, lobby
- M.O. 308, lobby
- Bldg. 960, lobby
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- Bldg. 6585 (TA V), lobby
- Bldg. 905, lobby
- 800(A), outside of Vicki's

SANDIA CLASSIFIED ADS

MISCELLANEOUS

ISLAND LIGHT, 4 lights, polished chrome, w/white linen, 29-3/4", new, $200; chaise lounge, black, converts to sleeper, 3 reclining positions, modern, $120. Martinez, 505-274-2787.

BEARDED DRAGONS, 3, unusual, w/accessories, son moved out, these must go, $100 ea. OBO. Pryor, 505-301-7801.

YARD SALE, Friday, June 1, 8 a.m.-2 p.m., Young at Heart Choir at The Journey, 2518 Eubank NE. Martin, 505-281-7227.

CHICO'S GIFT CARD, $45 (originally $50). Kaplan, 505-298-7953.

DALLAS COWBOYS TICKETS, single game, section 454, row 3, seats 1 & 2, $300/pair. McCandless, 505-553-5281, leave message for Suzanna.

CEMETERY LOTS, 2, Fairview cemetery, $3,200; Lowrey organ, w/extras, $65. Campbell, 505-888-3135, ask for John.

SOUND SYSTEM, Bose, just like https://tinyurl.com/y9qo4xx4, $100; top-load washer, workhorse, $25. Vigil, 575-386-6377.

INK CARTRIDGES, HP OfficeJet, #940XL, 4 (black, cyan, magenta, yellow), unopened, old printer died, $50/all. Pitts, 505-293-5481.

POOL TABLE, Brunswick, red felt top, w/cover, balls, 2 racks, pool cues/rack, you pick up, hardly used, $2,000. Kornemann, 703-967-8658.

DIGITAL SLR, Nikon D7100, w/18-55 lens, battery, charger, SD card, bag, $450. Schwartz, 505-220-6301, ask for Barry.

TURNTABLE, Crosley, radio, CD player, digital audio, retro-style, never used, $65. Wagner, 505-504-8783.

ROLL-TOP DESK, oak, like new, excellent condition, contact for photos, $650. Brewster, 505-238-4704.

ANATOLIAN SHEPHERD PUPS, in Belen, vet checked, 1st, shots, photos available, $600. Fredericks, 505-302-8052.

MOBILITY SCOOTER, 4-wheel, Pride Legend, new batteries, very good condition, $1,100; Cybex recumbent exercise bike, like new, $550. Fluckey, 505-821-1557.

PORTABLE GRAND PIANO KEYBOARD, Yamaha, w/stand & instruction manual, $350. Greulich, 505-503-1885.

UTILITY TRAILER, X-Cargo, 1 axle, w/bracket for cooler or toolbox, in East Mountains, great for motorcycle travel, $375. Willmas, 505-281-9124.

GENERATOR, Generac, 2500-W, never used, never put gas or oil in, $450, send an email if interested. Kelly, 505-933-1742, btk87110@gmail.com.

BED FRAME, queen, beautiful solid pine, only 5 yrs. old, text for photos, $150. Bigney, 505-917-7591.

VINTAGE DIAMOND RING, 1.05 carat, platinum setting, photos at http://www.fabulousfelines.org/?page_id=2588 retail $4,200, asking $2,900. Stubblefield, 505-263-3468.

SEWING/EMBROIDERY MACHINE, Bernina 780, w/extras (training, Feetures books, maxi hoop, mega hoop, more), $3,800. Chavez, 505-710-4519.

DINING TABLE, w/4 chairs, $65; Papasan chair, w/cushion & footrest, $75; text for photos. Black, 505-331-9147.

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DEADLINE: Friday noon before week of publication unless changed by holiday.

Submit by one of these methods:

- **EMAIL: Michelle Fleming (classads@sandia.gov)**
- **FAX: 844-0645**
- **MAIL: MS 1468 (Dept. 3651)**
- **INTERNAL WEB: From Techweb search for 'NewsCenter', at the bottom of that page choose to submit an ad under, 'Submit an article'. If you have questions, call Michelle at 844-4902.**

Because of space constraints, ads will be printed on a first-come basis.

Ad rules

1. Limit 18 words, including last name and home phone (If you include a web or e-mail address, it will count as two or three words, depending on length of the address.)
2. Include organization and full name with the ad submission.
3. Submit ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. One ad per issue.
6. We will not run the same ad more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active Sandia members of the workforce, retired Sandians, and DOE employees.
10. Housing listed for sale is available without regard to race, creed, color, or national origin.
11. Work Wanted ads limited to student-aged children of employees.
12. We reserve the right not to publish any ad that may be considered offensive or in bad taste.

TRANSPORTATION

'01 VW JETTA, Wolfsburg, $1,100. Manke, 505-281-4473.

'12 CHEVY CORVETTE LS3, AT, 6-spd., paddle-shift, 430-hp, white exterior, black leather, 20K miles, car/tires excellent shape, $30,000 OBO. Morales, 505-859-0832.

'90 GEO PRISM, a.k.a. Corolla, manual transmission, ~235K miles, runs but needs PS pump, struts, $775 OBO. Payne, 505-349-4286.

RECREATION

ROAD BIKES: '16 Louis Garneau Steeple-X, 21-in., $600; '15 Fuji Roubaix 1.0 LE, 22-in., $500. Wolf, 505-750-7004.

ADULT MOUNTAIN BIKES, 2, almost new, Avalanche GT, 24-spd., disk brakes, front suspension, $350 ea. Sturgeon, 505-975-6565.

EDDY MERCKX CORSA SL, 59 cm c-c, no decals, mixed components, great for commuting, $150. Chow, 505-286-2570.

DOWNHILL MOUNTAIN BIKE, Trek Session 9.9, carbon frame, Fox suspension, excellent shape, ready-to-ride, $3,500. Valdez, 505-699-9522.

ROAD BIKE, '14 Scattante W570, very low mileage, aluminum frame, carbon fork, Shimano components, paid $1,200, asking $600. Dennett, 505-379-9971.

'95 HONDA GOLDWING SE, extras, new tires & battery, Corbin seat, teal, 83K miles, $4,500. Sanchez, 505-720-2340.

MOUNTAIN BIKE, Diamondback, 18-in. frame, lots of upgrades, 2 mos. old, like new, photos available, $300. Vigil, 505-999-7566, ask for Jared.

REAL ESTATE

3-BDR. HOME, 2 baths, 2,300-sq. ft., detached 2-car garage w/storage, 1/2-acre, Northern NM, outside Cuba, $139,900. Gallegos, 505-220-4436.

LOTS, 40-ft. x 200 ft., ready to build, buy 1 or 9, 98th & Ladera, $60,000 ea. or $495,000/all. Sanchez, 505-515-5997.

3-4-BDR. HOME, 2-1/2 baths, 2-1/2 car garage, 2,700-sq. ft., 1.33 acres, city/mountain views, 5 mins. to Tramway/Central, Tijeras Canyon, MLS#918279, $465,000. Bickes, 505-597-4037.

TWO ACRES, Edgewood, 3 miles north, all utilities at property line, natural gas, Entranosa membership included, $45,000. Huppertz, 505-573-7916.

WANTED

PUREBRED PUPPY, Shih Tzu, Westie, Schnauzer, Havanese, well socialized, ready for re-home July, low allergy, preferably pad trained. Rockwell, 505-250-3737.

HIGH SCHOOL STUDENT, summer job, Sandia Heights, care for 2 Husky puppies, 1-1/2 hrs./weekday, $12/hr. Hartley, 352-872-2736.

ANGLE goes to the dogs... and cats

By Stephanie Holinka

Sandia staff collected donations for four local rescue groups that provide shelter and fostering for dogs and cats in need as part of the Homeward Bound Drive, supported by Community Involvement. The outreach group, Advancing the Next Generation of Leadership Excellence, collected consumables and encouraged Albuquerque non-profit rescue organizations to promote their work during the drive.

Caroline Winters of ANGLE identified animal rescue organizations as a community that Sandians were interested in and organized the event to help find homes for animals in need.

"I adopted my dog Arthur when I first moved to Albuquerque, and it struck me that I could not have found him without help from volunteers," said Caroline, a postdoc in plasma science. "After talking with them, I see their mission as twofold: taking care of adoptable animals every day and performing outreach such as open vet clinics, behavior training and pet retention programs."

ANGLE collected grain-free wet and dry pet food, collars and leashes at several locations around the Labs and hosted representatives from the four rescues at the Thunderbird Café. Two organizations, June's Senior Cat Rescue and Lap Dog Rescue of New Mexico were founded by Sandia employees. ANGLE also hosted High Desert Cat Rescue and Animal Humane of New Mexico.

June's Senior Cat Rescue

Sandian Janet Philippsen, a training designer, founded June's Senior Cat Rescue in 2013 after her mother June passed away, leaving behind her senior cat Ninety Nine.

"I knew Ninety Nine would be euthanized at the shelter. So I drove to California to bring her home. On the long drive home, I decided that I was going to do something to help the senior cats who are displaced when their owner dies. That was when June's Senior Cat Rescue was born," Janet says.

Janet says though June's does find homes for some cats, many will stay with the rescue for the rest of their lives. "In fact, some owners ask us not to adopt them out so that they don't have to go through another big change in their life, since cats aren't big on change," she adds.

Lap Dog Rescue of New Mexico

Sandia retiree C. Marie Steele co-founded Lap Dog Rescue in 2001 after many years helping small dogs in Albuquerque shelters find homes. Since those informal beginnings, the rescue has grown, placing about 700 dogs last year.

Lap Dog Rescue takes in animals for foster homes from local rescues, rural shelters and partner rescues in Juarez, Mexico.

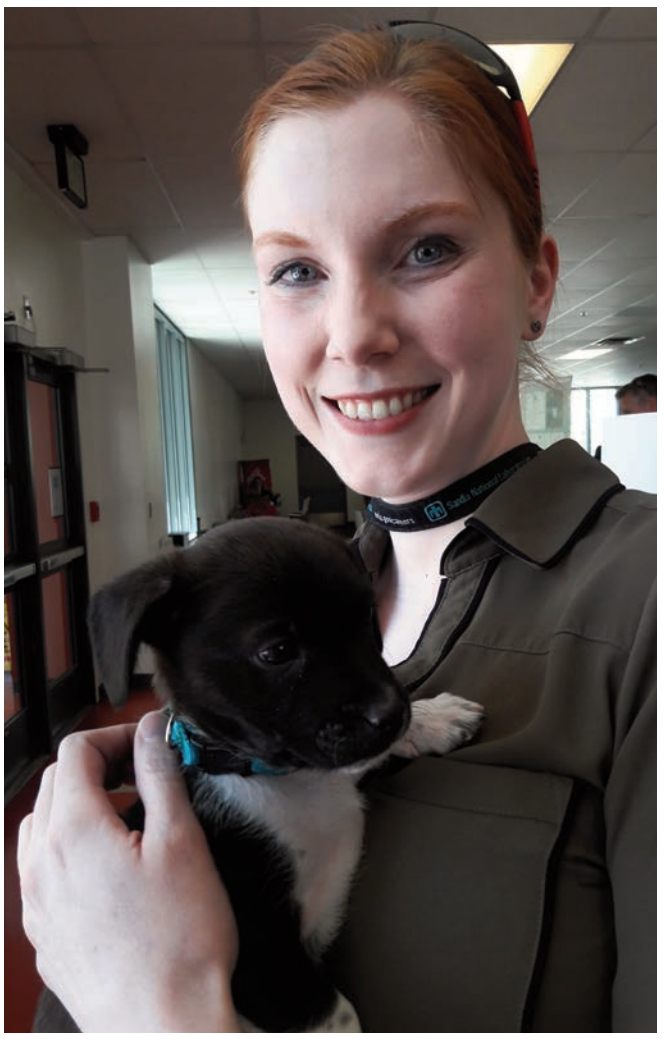
High Desert Cat Rescue

High Desert Cat Rescue & Adoption was founded in 2007 by Pam Russell and a group of experienced volunteers from other local rescue groups.

Current HDCRA President Brad Stebleton said that the founding group felt that cat rescue did not receive the same amount of attention as dog rescue, and that a group solely focused on the unique needs of cats was needed.

Animal Humane New Mexico

Animal Humane New Mexico is the state's leading private animal welfare organization serving cats, dogs and their families. Animal Humane partners with shelters across the state to rescue homeless pets and improves the lives of New Mexico's cats and dogs through adoptions, humane education and veterinary services.



ANGLE's Caroline Winters, shown here with Lap Dog Rescue adoptable puppy Elgin, organized the Homeward Bound event. (Photo by Stephanie Holinka)

"Animal Humane is a great place to add an adoptable cat or dog to your family, and it's also a place to turn to for pet resources," said Leah Remkes. "Animal Humane operates a pet food bank, a behavior helpline, and holds positive training classes for all ages to strengthen the bond between pets and their people."

All four rescues always seek volunteers with extra space in their homes and their hearts to help down-on-their luck dogs and cats find their way home.

Catching Dreams

Sandia volunteers bring STEM to rural New Mexico students

By Lindsey Kibler
Photos by Randy Montoya

Sandia volunteers traveled to Gallup, New Mexico, April 27, to bring hands-on science and engineering activities — like a Lego robotics class — to more than 60 New Mexico middle and high school students. The activities were part of Sandia's Dream Catchers Science Program at the University of New Mexico-Gallup campus.

This is the second year Sandia has partnered with New Mexico Mathematics, Engineering, Science Achievement, or MESA. MESA's mission is to empower and motivate New Mexico's culturally diverse students with enrichment in science, technology, engineering and math, or STEM, through partnerships with local colleges and universities, said Shawndeana Smith, MESA's west region coordinator.

One of the most obvious benefits of the partnership is the ability to bring the program to more rural areas, said Smith. Of the nearly 3,800 students who participated in MESA last school year, 78 percent were minorities. In the west region, where Shawndeana works, 98 percent of the roughly 500 MESA students are American Indian. Students who participated in the event were from Gallup-McKinley and Grants-Cibola county school districts, as well as Bloomfield Municipal schools and Navajo Preparatory School.

In 2011, American Indians accounted for only 0.4 percent of those working in STEM fields, according to a U.S. Census Bureau report.

The event was cancelled in mid-April due to the Bluewater and Diener Canyon fires, near Grants, which burned more than 10,000 acres, forced hundreds to evacuate their homes and caused power outages across the area.

Dream Catchers is designed for American Indian students in grades 6 through 12 and seeks to increase American Indian student interest in a variety of STEM careers. The program was launched in 1991 by Sandia's American Indian Outreach Committee.

Lozanne Meyer, Dream Catchers program lead, said she hoped participants "had fun being exposed to new ideas, concepts and opportunities; that they learned how to develop problem-solving and critical-thinking skills; and that they had the opportunity to visit a college campus and can one day envision themselves in college pursuing a degree in a STEM-related field."